NEWA (Northeast Weather Association) 2004: A Year in Review

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Project location(s): all counties in New York. Website accessible internationally.

Abstract: The Northeast Weather Association (NEWA) maintained the electronic weather network in the 2004 growing season with support from NEWA members, the NYS IPM Program, and two grants. NEWA usage continued to increase in 2004, up 16% over 2003. The number of people receiving NEWA information is much larger than that measured by web hits since information from NEWA is used in crop updates and Extension newsletters. In 2004 the NEWA Association was dissolved and the NYS IPM Program assumed leadership and financial responsibility for NEWA. On the NEWA web site, the National Weather Service continued to provide weather forecasts and new forecast products, including NOAA web radio broadcasts and degree day forecasts specific to weather station locations. The Northeast Regional Climate Center (NRCC) provided links to evapotranspiration (ET) maps and daily ET information based on data from their cooperative network. New from NRCC this year was a map depicting the Stewart's Wilt forecast for New York. The NEWA network expanded to include additional sites in Chazy, Clintondale, Red Hook and Clifton Park as part of NE SARE and NE Regional IPM grants. The DMCast, grapevine downy mildew model, was linked in NEWA for the second year and refinements to it made. A weather database of NEWA data, created to support DMCast, provided the basis for several weather data applications developed in 2004, including: a degree day calculator, an apple pest degree day calculator, and a Specware data conversion program. A plan to convert the present NEWA system to a database driven web site is being developed with Spider Graphics.

Objectives:

1) Maintain and upgrade the NEWA electronic weather network for 2004.
2) Solicit new members for NEWA from among producers of fruit, vegetables, and field crops, and others.
3) Dissolve the NEWA "Association" and transfer responsibility for NEWA to the NYS IPM Program. NYS IPM continues free subscriptions to NEWA in 2004.
4) Expand the cooperative arrangement with the Northeast Regional Climate Center to provide evapotranspiration data from capable sites in the NEWA network.
5) Expand the NEWA network into Eastern NY.
6) Deploy weather data models, including: Degree Day calculator, Apple Pest DD Calculator, DMCast, Spectrum Data Conversion.
7) Formulate a plan to convert the NEWA website to a database driven application.

Procedures, Results, and Discussion:

1. MAINTAIN AND UPGRADE THE NEWA ELECTRONIC WEATHER NETWORK FOR 2004.

During the 2004 growing season NEWA was able to successfully maintain and operate the electronic weather network. Server sites in Geneva and Canandaigua gathered weather data daily from 40 data loggers. NEWA continued to provide data from several sites through the winter to provide weather data for Stewart's wilt forecasts for sweet corn in New York. Also sites are maintained in winter to keep track of low temperatures in vineyards and apple orchards. NEWA assisted four new installations in Eastern New York (see objective 5 for more details).

The network itself was operational on 100 percent of the days between April 1 and October 31, although individual instruments experienced down time from lightning strikes and other problems. The year 2004 featured abnormally wet and cool conditions and thunderstorm activity continued to cause sporadic problems to the network. Although lightning damaged six installations, the problems were generally remedied within one or two days of occurrence unless damage to the instrument was major, in which case the instruments were returned to the manufacturer for repairs. The data were summarized and used to operate pest forecast models for potatoes, onions, apples, grapes, cabbage, sweet corn, and tomatoes daily. Degree day accumulations were calculated for different base temperatures using several degree-day models as needed by different client groups.

As a result of user input several changes were made to information and model output. Degree days with a base of 45^0F were added to forecast for Oriental Fruit Moth. In the apple scab leaf wetness reports, the duration of drying hours were tabulated in addition to the duration of wetting hours making it easier to determine the time elapsed between two wetting periods and whether to combine them.

In 2004, NEWA continued to provide degree day forecasts based on information provided by National Weather Service (NWS) forecasts. These forecasts were provided Monday – Friday and were available by 7AM each morning for all stations downloaded in the NEWA network. Degree day bases of 50F, 48F, 43F, 40F and 4C were provided. In addition, links to new NWS products were added as they became available. One such product added this year was the link to provide NOAA weather radio audio. Users can click on links to different weather radio products and hear forecast information as they would if they were listening to their weather radio. This is significant because NOAA weather radio broadcasts are not available in all areas of NY. This service is currently sourced from the Buffalo office.

2) SOLICIT NEW MEMBERS FOR NEWA FROM AMONG PRODUCERS OF FRUIT, VEGETABLES, AND FIELD CROPS, AND OTHERS.

Since 2002, access to the NEWA website and all NEWA weather data and associated information has been provided free of charge with funding through the New York State IPM Program provided by the NYS Department of Agriculture and Markets. Announcements about free NEWA access were again placed in local Extension newsletters. As a result, since 2002, NEWA usage has continued to increase (Table 1 and Figure 1). NEWA usage increased 16% in 2004 compared to 2003 and increased 25% compared to 2002. Compared to 2001, when fees

were assessed to access NEWA, hits to the NEWA web site more than doubled. NEWA information is also redistributed in several CCE newsletters to reach many farms.

Free access to NEWA was pivotal to securing grant funding for expansion into Eastern NY and recruitment of new users among apple growers and Cornell Cooperative Extension personnel in this region of NY (see objective 5). Free access to NEWA changes the focus of recruitment of new members for NEWA to promoting its availability and utility to potential new users who would access it freely. To this end, NEWA personnel set up demonstrations at trade shows and workshops. A new poster was made and displayed at the New York Fruit and Vegetable Expo held February 2004 in Rochester, NY; and a new tri-fold brochure was produced.

Table 1. NEWA web access for 2001, 2002, 2003, and 2004 showing total number of hits for each month and eleven month totals (January to November) for each year.

NEWA Hits	2001	2002	2003	2004
January	791	1960	3131	6260
February	1891	769	3515	2986
March	1860	2330	2933	2695
April	3022	4272	3967	5902
May	6105	9432	9533	9969
June (free access began June 2002)	4940	11323	9286	8810
July	5082	6472	6934	7590
August	3592	5309	5846	6371
September	1853	4469	4060	4627
October	1428	3240	3104	3423
November	1040	1895	2776	3296
December	636	1420	2088	4210
Total Hits January to December	32240	52891	57173	66139

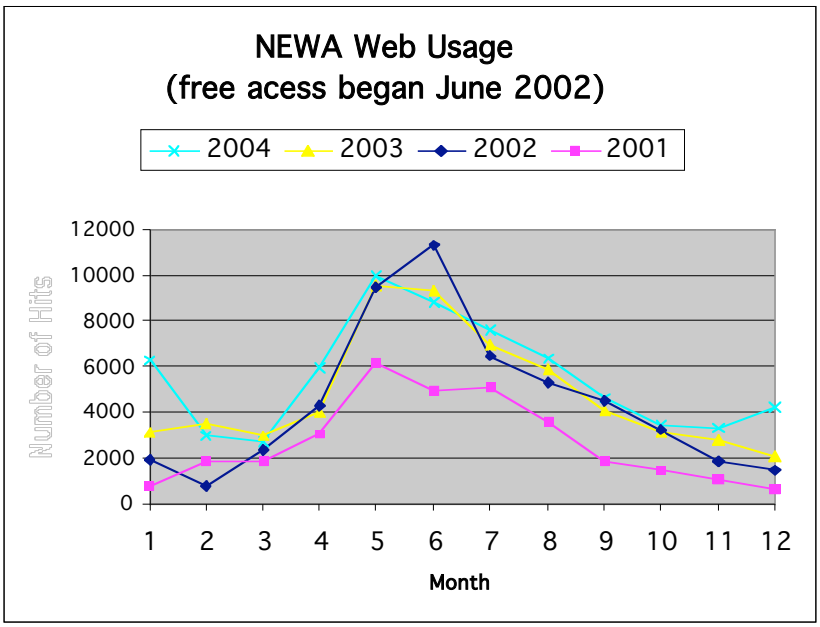

Figure 1. Web access to NEWA for 2001, 2002, 2003, and 2004. For all months in 2004 (except February, March, and June) the number of hits to the NEWA website exceeded those of previous years.

In addition to agricultural clientele, NEWA information was also utilized to assist the NYS police in a criminal investigation. Investigator Tom McHugh said "When looking for a regional weather resource my first thought was Cornell and you didn't let me down. I will pass the site information (NEWA) on to others in our organization. It was very convenient to have a publicly accessible site. It saved a bunch of telephone calls."

NEWA continues to attract attention from potential

partners interested in weather data collected from instruments on the ground and archived in accessible format. In 2004, NEWA leaders conferred with non-traditional audiences and potential partners including The Institute for the Application of Geospatial Technology at Cayuga Community College, Inc., the New York State Soil and Water Conservation Committee, the Natural Resources Conservation Service, the New York Agricultural Statistics Service, Spectrum Technologies Inc., Onset Computer Corporation, and RainWise Inc.

3) DISSOLVE THE NEWA "ASSOCIATION" AND TRANSFER RESPONSIBILITY FOR NEWA TO THE NYS IPM PROGRAM.

In 2004, the NEWA Association was dissolved and the NYS IPM Program took on full responsibility for NEWA leadership and funding. This change was necessitated due to the elimination of user fees and the associated NEWA funds. This change was seen as positive in light of the increased usage of the NEWA weather information and IPM pest forecasts. Challenges for the NEWA leadership will include sourcing grant funds to support improvements and expansion of the weather network as well as developing new logos or titles to acknowledge the NYS IPM Program as the main funding partner.

Web pages describing NEWA were adjusted in 2004 to reflect the change in leadership of the NEWA network, including the web portal/password page. The website plan to transition to a database format (see objective 7) will take into account the changes in the NEWA organization and adjust wording, logos, and titles on all web pages accordingly.

4) EXPAND THE COOPERATIVE ARRANGEMENT WITH THE NORTHEAST REGIONAL CLIMATE CENTER.

In 2004 the Northeast Regional Climate Center (NRCC) continued to provide links to evapotranspiration (ET) maps and degree-day maps. This data is compiled from information provided by airport observation sites and the Cooperative Observer Network sites. The NRCC provided daily ET readings to NEWA and a seasonal log was prepared and displayed on the NEWA web site. The NRCC also provided a map of New York showing the Stewart's Wilt forecast for 2004. Other types of applications are being explored that the NRCC can assist NEWA with in subsequent years.

5) EXPAND THE NEWA NETWORK IN EASTERN NEW YORK

The NEWA network is being expanded into Eastern NY with funding from a NE SARE Partnership grant and a NE Regional IPM Program Critical Steps grant. In this project cooperating growers will learn how to use NEWA, source weather data, interpret weather data and pest forecast models, and integrate weather data with scouting and monitoring to improve IPM practices. The outreach plan will target all other apple growers in Eastern NY who will benefit from the expansion of NEWA into their region. The project goals are to enable apple growers to conduct IPM for eight major apple insect pests and diseases for which degree day models are available to time key IPM activities. In order to accomplish this, apple growers must have access to weather information and pest forecast models. The Northeast Weather Association (NEWA) can provide both for free, fostering IPM implementation, environmental conservation, and land stewardship. To expand NEWA into Eastern NY, four growers upgraded or purchased weather stations and connected to NEWA.

Due to late delivery of the weather equipment a no-cost extension was applied for to extend the project into 2005 and 2006. Early in 2004, Sensatronics stopped manufacturing the Field Monitor, the weather station formerly used at most NEWA sites. While Sensatronics will continue to service existing Field Monitor weather stations, it was necessary to find another manufacturer of weather stations for the NEWA network. RainWise, Inc. extended to NEWA a 30% educational discount on its commercial grade loggers, offered to develop software needed to allow access of the weather data to the NEWA network without compromising grower access, and provided the sensors needed to run the IPM pest forecast models. Although the RainWise weather stations posed hardware and software challenges for the NEWA network, RainWise staff developed software and communication technology to make the output of their loggers similar to the output of the Field Monitor so the data can run through the NEWA system.

Three out of four new weather stations were connected to the NEWA network in Eastern New York. One of these sites upgraded an existing Field Monitor from Sensatronics (Clifton Park) and the other two installations used equipment manufactured by RainWise, Inc. (Clintondale and Chazy.) The grower with the Field Monitor weather station found the NEWA web-based weather data to be very useful, including access to data during rain and improved IPM decisions for apple scab and apple maggot. The fourth location (Red Hook), also RainWise, is currently being serviced due to a lightning strike and communications issues. The slow start on the project created some disappointment for the RainWise growers, however all are still on board and looking forward to collecting weather data from their farms during the 2004 growing season and applying it to IPM and crop management decisions. One positive outcome of the third weather station being at RainWise is their programmers are exploring the possibility of downloading the logger via a DSL Internet provider. This would eliminate the need for a modem and would reduce the chances for lightning damage, a recurring problem with the network. RainWise has also offered to write software that would FTP the data files to the NEWA sever on a daily basis.

6) DEPLOY WEATHER DATA MODELS AND APPLICATIONS, INCLUDING: DEGREE DAY CALCULATOR, APPLE PEST DD CALCULATOR, DMCAST, AND SPECTRUM DATA CONVERSION.

As part of the NE Regional IPM grant, an interactive degree day calculator is being developed for the NEWA weather data. The degree day calculator will provide users with the ability to select a weather station location, a base temperature, input their own start and end dates date and get back the accumulated degree days. An apple pest degree day calculator is also being developed wherein the users can select the weather station location, the apple pest of interest, input their biofix date and end date and get back the accumulated degree days for that pest's base temperature with a message indicating the IPM decision associated with the degree days accumulated. If the user does not have their own biofix date, the program will automatically default to the historical biofix for that apple pest based on New York data for the previous three decades, as reported in the Cornell Pest Management Guidelines for Tree Fruit.

The grapevine downy mildew risk model, DMCast, created by Robert Seem's research program, was linked to the NEWA web site. This model and the associated web output pages are created from NEWA weather data that is uploaded into a database. This was the second year running the DMCast risk assessment model on NEWA. Improvements to the model output were

made to make the output more user-friendly and easier to interpret. As more weather stations are upgraded to include RH sensors, this important risk assessment for downy mildew will automatically become available for those locations.

A data conversion program was written as part of the NE Regional IPM grant that will take NEWA data and convert it into Spectrum Technologies data format. This will allow users to download NEWA weather data to their own computers in a format that will run in Spectrum Technologies pest forecast models, SpecWare version 6. This program is currently being tested and readied for going live in 2005.

7) FORMULATE A PLAN TO CONVERT THE NEWA WEBSITE TO A DATABASE DRIVEN APPLICATION.

The NE Regional IPM grant provided the opportunity to contract with Spider Graphics to develop a NEWA web site plan to define the steps and process to transition the current NEWA text file system into a database driven application. The development of a weather database containing NEWA data for the DMCast model provided the means to embark upon this planning process. The new applications described in objective 6, above, are based on real-time calculations using the DMCast's weather database. As NEWA personnel began exploring the possibilities that could be built from the weather database (i.e. expansion of the network and its associated IPM forecasts) it became clear that future development of NEWA needed to involve a plan and projected budget to accomplish this goal. A NEWA planning group has been assembled and will meet three times to assist Spider Graphics in web planning and budget development. This group met once in 2004 and an initial draft web site plan was developed.